LUDLUM MEASUREMENTS, INC.

Model 3004 Series

Neutron Dose Survey Meter with Optional Internal Detector

Features

- Moderated Neutron Detector
- Range: 0 - 100 mSv/h (0 - 10,000 mrem/hr)
- Gamma Rejection up to 0.1 Sv/h (10 R/hr)
- Large Backlit LCD for Ease of Reading
- Auto-Ranging
- Rate, Max, Count & Dose Modes of Operation
- Splash-Resistant Construction for Outdoor Use
- All-Digital Calibration
- Lightweight and Ruggedly Built
- 4-Button Intuitive Interface for Easy Operation

Introduction

The Model 3004 Neutron Dose Survey Meter combines a handheld digital meter with a 22.9 cm (9.0 in.) diameter REM ball containing a ^{3}He detector to measure and monitor neutron radiation. The Model 3004i Neutron Dose Survey Meter with Internal Detector and its variants include an internal gamma detector in the meter for exposure or dose measurements (see table at right for available versions). Each instrument features a large, easy-to-read LCD screen and audible alarms, and is controlled using a simple five-button interface. The meter body is made of high-impact plastic, and splash resistant construction allows the instrument to be used outdoors.

Four modes of operation are available – RATE, MAX, COUNT, and DOSE – which can be selected by pressing the MODE button. Measurements can be collected in two sets of units (primary and secondary) for RATE and MAX modes in cps, cpm, Bq, dpm, mR/hr, mrem/hr, or µSv/h units. The user can switch between two sets of units by pressing the UNITS button. When enabled with the optional Lumic Data Logger Kit (see options), data can be logged in any of the operational modes using the LOG button on the handle. Up to 1000 data points can be stored internally.

Instrument setup can be done either through the front-panel controls or via the Lumic Calibration Kit (see options). The Model 3004 is shipped ready to use with batteries and a calibration certificate.

Internal Detector Options

Model	Internal Detector / Range	Part Number
3004	N/A	48-4293
3004i	Energy compensated GM 1 µSv/h to 50 mSv/h (0.1 mR/hr to 5 R/hr)	48-4442
3004i/1*	CsI scintillator, 18 x 18 mm (not energy compensated) Background to 500 µSv/h (50 mR/hr) Sensitivity: 100 cpm/µR/hr	48-4442-1
3004i/4	Energy compensated GM 10 µSv/h to 500 mSv/h (1 mR/hr to 50 R/hr)	48-4442-4
3004i/6	Energy compensated GM 40 µSv/hto 10 Sv/h (4 mR/hr to 1000 R/hr)	48-4442-6

* While the internal detector used in this instrument is sensitive and is often used for detection of near-background levels of radiation, its nonlinear energy response means that dose and exposure measurements may be over/underreported.

Ludlum Measurements, Inc. P.O. Box 810, Sweetwater, Texas 79556
Web: ludlums.com **Tel**: 800-622-0828 / 325-235-5494 **Fax**: 325-235-4672 **Email**: sales@ludlums.com
Note: specifications subject to change without notification. We are not responsible for errors or omissions.

Specifications

MEASUREMENT RANGE: 0-100 mSv/h (0-10,000 mrem/hr)
DETECTOR: ^{3}He proportional detector, 1.6 x 2.5 cm (0.6 x 1.0 in.) [D x L], surrounded by 22.9 cm (9.0 in.) diameter cadmium-loaded polyethylene sphere
SENSITIVITY: typically 10 cpm per µSv/h (100 cpm per mrem/hr) [bare AmBe neutrons]
ENERGY RESPONSE: provides an appropriate inverse RPG curve for neutrons from thermal through 7 MeV, provides response up to 12 MeV
GAMMA REJECTION: < 10 cpm through 0.1 Sv/h (10 R/hr) [^{137}Cs gamma]
THRESHOLD: -2 mV
HIGH VOLTAGE: adjustable from 300 to 2400 Vdc
OPERATING VOLTAGE: approximately 1200 Vdc
LINEARITY: reading within 10% of true value
INTERNAL DETECTOR ("i" versions): energy compensated GM or scintillation detector (see table on front)
MODES: four operational modes including rate, max, integrated dose, and count
DISPLAY: 3-digit LCD with large 20 mm (0.8 in.) digits. Units: (k)(M)c, (k)cps, (k)(M)cpm, (k)(M)d, (k)(M)Bq, (k)(M)Bq/cm^2, (k)(M)dpm, (µ)(m)(k)(M)R, (µ)(m)(k)R/h, (µ)(m)(k)(M)Sv, (µ)(m)Sv/h, (µ)(m)(k)(M)Rem, (µ)(m)(k)Rem/h Indicators: bar graph, radiation type (alpha (α), beta (β), gamma (γ), neutron (n)), model (MAX, INTG), three alarm levels (ALARM 1,2,3), fault messages (FAULT, OVERLOAD, LOSS OF COUNT, OVERRANGE), USB, wireless, audio, low-battery
DISPLAY RANGE: minimum and maximum display can be set to limit display to calibrated range.

- 00.0 cps to 999 kcps
- 00.0 cpm to 99.9 Mcpm
- 00.0 Bq to 999 MBq
- 00.0 Bq/cm^2 to 999 MBq/cm^2
- 00.0 dpm to 999 Mdpm
- 0.00 µR to 999 MR
- 0.00 µR/h to 9.99 kR/h
- 0.00 µSv to 999 MSv
- 0.00 µSv/h to 999 Sv/h
- 0.00 µRem to 999 MRem
- 0.00 µRem/h to 9.99 kRem/h
- 0 c to 999 Mc (counts)
- 0 d to 999 Md (disintegrations)

BACKLIGHT: built-in ambient light sensor automatically activates low-power LED backlight, unless internal dipswitch is set to continuous-on (will reduce battery life)
USER CONTROLS:

- ON/OFF (non-"i" version): press to turn ON, short press to acknowledge alarms and silence alarm tone, long press to reset RATE/MAX, hold for OFF
- ON/AUD ("i" versions): extra-long press to turn ON, short press to adjust audio "click" level, extra-long press plus 3 seconds to turn OFF
- UNITS: short press changes the units between count rate, dose/exposure, or activity
- AUDIO (non-"i" version): short press to adjust "click" audio level
- DETECTOR ("i" versions): short press to change between external and internal detectors
- MODE: short press alternates between modes: RATE (displays count rate), MAX (captures peak rate), COUNT (user-selectable preset count time from 0 to 31.68 years), and DOSE (current accumulated dose).
- LOG: short press to log current display (requires Lumic Data Logger Kit, see options) or initiate count in COUNT mode, extra-long press to change count in COUNT mode

RESPONSE TIME: user-selectable from 1 to 60 seconds, auto SLOW, auto FAST, fixed SLOW (22 s), fixed FAST (4 s)
ALARMS: three adjustable alarm setpoints for each unit in all four modes of operation
SELF-DIAGNOSTICS: detects and reports internal instrument issues, indicated by showing FAULT on the display and an audio warning
OVERLOAD PROTECTION: high count rate saturation protection prevents false display of lower count rates. If the instrument detects an overload condition, it will display the OVERLOAD icon and trigger an audio warning.
LOSS OF COUNT PROTECTION: after typically 60 seconds of no pulses from the detector, the alarm audio will be triggered and the LOSS OF COUNTS icon and the affected unit will be displayed
OVERRANGE: if the reading exceeds the predefined detector range, the instrument will flash a maximum reading, display the OVERRANGE icon, and trigger an audio warning
AUDIO: approximately 4.5 kHz, click audio greater than 65 dB at 0.6 m (2 ft), alarm audio greater than 72 dB
CALIBRATION PROTECTION: internal dipswitch to disable front-panel calibration parameter changes
POWER: four alkaline "AA" batteries
BATTERY LIFE:
Non-"i" versions: approximately 750 hours of operation
"i" versions: approximately 175 hours of operation
16-hour low battery warning
WORKING ENVIRONMENT: splash-proof shields for outdoor use
CONSTRUCTION: high-impact plastic with water-resistant rubber seals and separate battery compartment
TEMPERATURE RANGE: -20 to 50 °C (-5 to 122 °F), may be certified for operation from -40 to 65 °C (-40 to 150 °F)
ENVIRONMENTAL RATING: NEMA 3x / IP 53
SIZE (H x W x L): 41.1 x 23.1 x 25.1 cm (16.3 x 9.1 x 9.9 in.)
WEIGHT: 8.3 kg (18.3 lb), with batteries

Options

- Lumic Calibration Kit (PN: 4519-865)
- Lumic Configuration Kit (PN: 4519-747)
- Lumic Data Logger Kit (PN: 4498-1019)
- M 3000 Gen 2 Series Bluetooth® LE Option (PN: 4519-564)
- Headphone Jack (PN: 4498-555)
- Carrying Case (PN: 2310377)
- Rolling Case (PN: 2311487)

The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc and any use of such marks by Ludlum Measurements, Inc. is under license. Other trademarks and trade names are those of their respective owners.

Ludlum Measurements, Inc. P.O. Box 810, Sweetwater, Texas 79556
Web: ludlums.com **Tel**: 800-622-0828 / 325-235-5494 **Fax**: 325-235-4672 **Email**: sales@ludlums.com
Note: specifications subject to change without notification. We are not responsible for errors or omissions.